

## Iatrogenic laryngomucocele: a report of two cases

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**Key-words.** Laryngocele; laryngeal surgery; laser surgery; laryngeal carcinoma; complication.

**Abstract.** *Background:* Laryngocele is an abnormal cystic dilatation of saccule in direct communication with the laryngeal airway. Etiology of laryngocele is still unclear, but both congenital and acquired reasons have been implicated in its development.

In this article, a combined laryngocele and an internal laryngocele which occurred following surgery, and the clinical and radiological features of the patients have been discussed.

*Results:* There may be a relationship between laryngoceles and laryngeal surgery. Symptoms and signs of the disease may show quite a variation according to factors such as the subtype of the laryngocele. Diagnosis can be made by the typical presentation and laryngoscopic evaluation in the majority of cases. Recommended treatment of laryngocele is surgical excision via transcervical or transoral approach.

*Conclusion:* Our cases show the possible association of laryngocele and previous laryngeal surgery. Pathophysiology may be explained by the ventricular mucosal remnant and development of scar tissue.

### Introduction

Laryngocele is a rare cystic dilatation which arises from the laryngeal ventricle. Congenital and acquired factors play a role in the laryngocele development although its etiology is not fully understood.<sup>1,2</sup> Laryngoceles are separated into the three groups according to localization; internal, external and combined laryngocele. The internal laryngocele is limited into the larynx and extends from the laryngeal ventricle to the false vocal cord and the aryepiglottic fold towards the posterosuperior direction. It appears as a well-defined mass in the supraglottic area during the laryngoscopic examination. The external laryngocele, which is an air-filled cystic mass, penetrates through the thyrohyoid membrane and turns into a neck mass in the superior level of the neck. The cases which include both internal and external components are called combined laryngocele.

The relationship between laryngocele development and having undergone head and neck surgery

is unclear. There are several studies showing that laryngoceles can occur after tracheotomy<sup>3</sup>, supracricoid laryngectomy<sup>4</sup>, subtotal laryngectomy<sup>5</sup>, anterior frontal laryngectomy<sup>6</sup> in the literature.

In this article a combined laryngocele developing after transoral carbon dioxide laser surgery and an internal laryngocele which arises following supracricoid laryngectomy were presented, and the clinical and radiological features of the patients have been discussed.

### Case Presentations

#### *Patient 1*

A 56-year-old man has undergone a left hemilaryngectomy via transoral laser microsurgery in our clinic a year ago. The primary lesion was a T2 glottic tumor localized in the anterior and middle portion of the left vocal cord with impaired vocal cord mobility, without extension to the ventricle, anterior commissure, and subglottic

*There is no conflict of interest among the author. No financial supporter of this study. The patients gave their consent for the case reports to be published. All authors contributed equally to this manuscript. All authors have read and approved the final manuscript.*

area. No complications were observed during the perioperative period. In the routine follow-up of the patient, all of the laryngoscopic examinations were normal. A soft compressible mass in the upper portion of the left neck was detected during the first-year control evaluation. The indirect laryngoscopy demonstrated a mild expansion on the left hemilarynx. On magnetic resonance imaging (MRI), a 38 x 28 x 35 mm cystic lesion adjacent to the left hemilarynx penetrating through the thyrohyoid membrane extending towards the submandibular gland was observed, which was hyperintense on T2-weighted images and hypointense on T1-weighted series (**Figure 1**). The lesion was accepted as an iatrogenic external laryngomucocele secondary to transoral laser laryngeal surgery and excised via a transcervical approach under general anesthesia (**Figure 2**). A direct laryngoscopy was performed at the same time to rule out a recurrence of laryngeal cancer. The patient has been under follow-up for 18 months without clinical and radiological recurrence.

#### Patient 2

A 51-year-old man was operated in our clinic via supracricoid laryngectomy with crico-hyoidoepiglottopexy due to a tumor originating from the left vocal cord, extending to the anterior commissure with a 0.5 cm subglottic extension. There were no complications during

the perioperative period. The nasogastric tube was removed on the first week after surgery and decannulation were successfully performed at the postoperative 10<sup>th</sup> day. The patient received monthly follow-up with indirect laryngoscopic examinations. On the 6<sup>th</sup> month of the operation, a sudden attack of difficulty in breathing following an upper respiratory tract infection was developed in the patient. During the indirect laryngoscopic examination, a submucosal mass obliterating the left residual hemilarynx and pyriform sinus was observed. Computerized tomography (CT) scans showed a cystic mass which has an air-fluid level with the dimensions of 17 x 23.5 mm. The patient was accepted as iatrogenic internal laryngomucocele due to the history of surgery and his radiologic and clinical findings. The lesion was marsupialised into the endolarynx with carbon dioxide laser. The patient has been under follow-up for 12 months after endolaryngeal laser surgery and there was no recurrence clinically and radiologically.

#### Discussion

Laryngocele was firstly described by Virchow as an abnormal dilatation of the laryngeal ventricle in 1867.<sup>7</sup> The incidence of laryngocele is estimated to be 1 per 2.5 million population every year<sup>8</sup> and that constitutes 5% of all benign laryngeal lesions.<sup>1,2</sup> On the other hand, the laryngocele may coexist with laryngeal malignancies and the frequency of

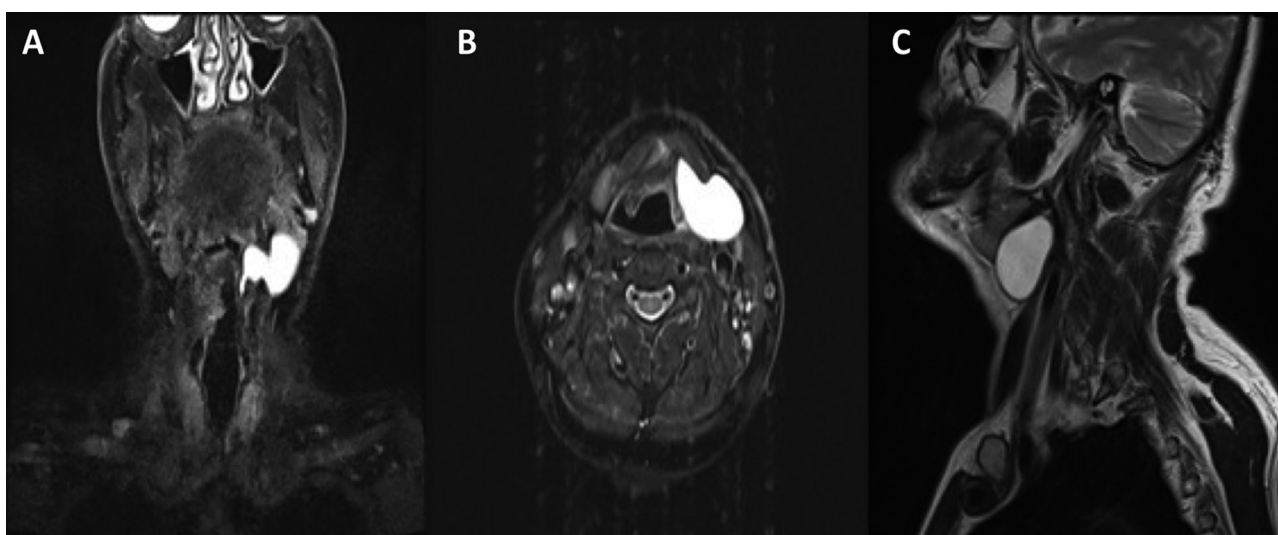


Figure 1

Coronal (A), axial (B) and sagittal (C) MRI sections show a combined laryngocele mass which associated with laryngeal lumen

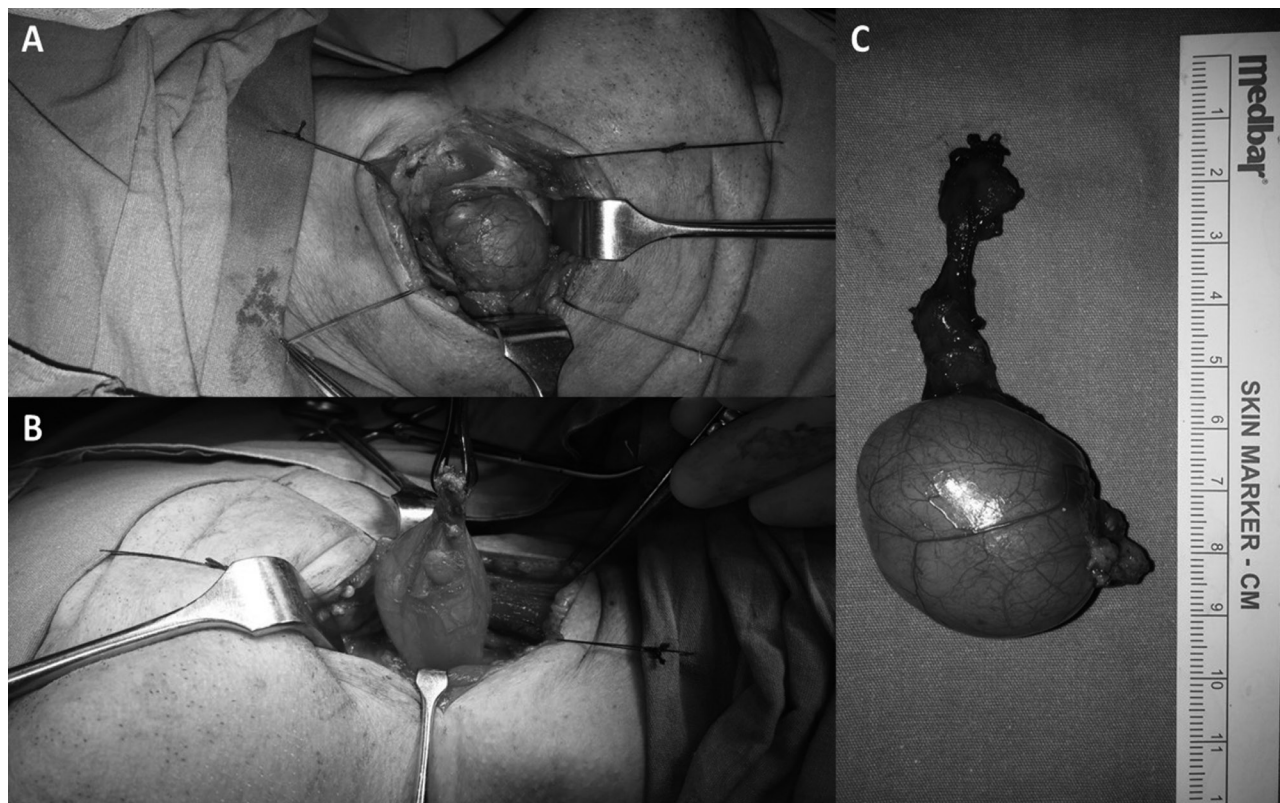


Figure 2

Part A and B demonstrate intraoperative view. Surgical specimen of the cystic mass after the complete resection was presented in part C.

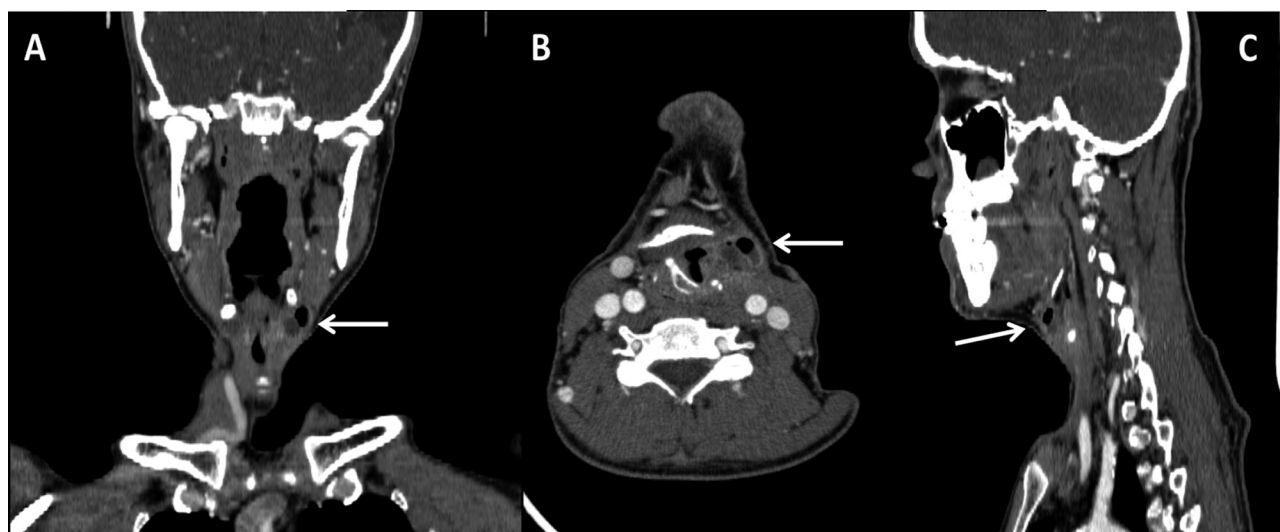


Figure 3

Coronal (A), axial (B) and sagittal (C) CT scans show an internal laryngocele mass which has air-fluid level (showed by white arrows).

that situation is approximately 5%.<sup>9</sup> Considering the cases that are not diagnosed clinically but determined radiologically, the association of laryngeal malignancies and laryngocele can be more frequent than expected. Therefore, it is important

to investigate the laryngeal carcinoma especially in heavy smokers and/or patients with alcohol consumption. In the patients with laryngeal cancer, distortion created by the tumor in the laryngeal ventricle works as a one-way valve mechanism and

causes saccular distension. Increased intraluminal pressure due to excessive coughing and speech effort leads to augment saccular distension and results in the formation of laryngocele. Nevertheless, the relationship between laryngoceles and laryngeal malignancies is not completely understood.<sup>10</sup>

The relationship between previous head and neck surgery and laryngocele development was reported by a few studies.<sup>6</sup> Symptomatic laryngocele formation has been described in 3% of patients following supracricoid partial laryngectomy. This is associated with incomplete ventricular resection during transepiglottic laryngotomy.<sup>6</sup> Strap muscles reconstruction which is performed during partial laryngectomy may also cause laryngocele formation through altering intralaryngeal pressure.<sup>3</sup> Moreover, there are laryngocele cases that develop after surgical procedures such as transoral laser surgery, thyroidectomy, and tracheotomy in the literature.<sup>6</sup> Current knowledge suggests that laryngeal tissue resistance which is weakened by surgery and increased intralaryngeal pressure play a key role in the development of laryngocele. Consistently, in our patient which had laser surgery, the ventricular mucosa remnant may have been left during hemilaryngectomy. The scar tissue that occurred during the healing period covered the residual mucosa and this resulted in laryngocele formation.

Symptoms and signs of the disease may show variation according to the factors such as the subtype of the laryngocele, affected anatomical structure and the obstruction grade in the airway. Internal laryngocele usually presents with respiratory distress, cough, hoarseness and globus sensation in the throat. It seems as swelling or mass at the level of the false vocal cord during the laryngoscopic examination. External laryngocele presents as a painless mass on the lateral side of the neck and is usually diagnosed incidentally. Symptomatology, clinical and radiological findings were similar in both our patients.

Diagnosis can be achieved by the typical presentation and laryngoscopic examination in the majority of laryngocele cases. The CT and MRI are both extremely useful for the differential diagnosis and also provide additional information in patients with diagnostic difficulty. The CT shows uncomplicated cases as a sac filled with air which is located in the lateral neck adjacent to the hyoid bone (external) and in the paralaryngeal space (internal)

or in both regions (combined). Laryngomucocele appears when the neck of the laryngocele sac is obstructed by chronic inflammation or tumor pressure and seems as a well-circumscribed mass that has an air-fluid level in CT scans.

Definitive treatment of the laryngocele is surgical excision. Surgical approach (transcervical or transoral) can be different according to the subtype of the laryngocele and size of the lesion.<sup>11</sup> Combined laryngocele that has the internal part and limited extralaryngeal extension can be resected with the transoral approach, while combined laryngocele that has more extralaryngeal extension can be excised with the transcervical approach.<sup>3,12</sup> In our series, laryngocele was excised via a transcervical approach in one patient and transoral laser surgery was applied to the other one.

### Conclusion

Laryngocele is an uncommon benign laryngeal mass. However, it should not be forgotten that a laryngocele may appear secondary to the laryngeal carcinoma and laryngeal surgery. Especially after the laryngeal cancer surgery, suspicious lesions should not be followed and surgical exploration must be done to rule out the possibility of recurrence.

### Abbreviations

MRI, magnetic resonance imaging; CT, computerized tomography.

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